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## MAMMALS COLLECTED IN THE MARITIME PROVINCE OF SIBERIA BY THE MORDEN-GRAVES NORTH ASIATIC EXPEDITION, WITH THE DESCRIPTION OF A NEW HARE FROM THE AMUR RIVER

BY G. G. GOODWIN

The trip undertaken by the Morden-Graves Expedition in eastern Siberia during the winter of 1929-1930 was made primarily for a group of Siberian tigers for the North Asiatic Hall of The American Museum of Natural History.

Leaving the Trans-Siberian Railway at Khabarovsk on December 22, 1929, we travelled north for four days down the Amur by horse sleigh to Troitskov, and then east through the forest for three days, by dog teams, to the Monoma River, about eighty miles east of Troitskov. After a few days collecting there, we returned to Troitskov and then back about twenty miles along the Amur to Nykin; leaving the Amur here, we made a two days' journey by horse sleigh to the Mukhen River and the Sacred Tiger Rocks, using a lumber camp on the Nelta River as a base. Our next camp was in the Ussuri River region, thirty miles east of Bikin.

Acknowledgment is due to Mr. William J. Morden and Mr. George C. Graves, who organized and led the expedition and assisted the writer in collecting small mammals; also to Mr. H. E. Anthony for advice in comparing and identifying the specimens.

### ***Sorex araneus borealis* Kastschenko**

Boreal Shrew

*Sorex araneus borealis* KASTSCHENKO, 1905, Bull. Imperial Tomsk University, XXVII, Tomsk, p. 86.

Two specimens. Nelta River.

This shrew is a fairly large brown species with the light color of the belly extending well up on the sides. Tail covered with stiff hairs and with a well-developed tuft of hairs at tip.

Color of upperparts between Prout's brown and mummy brown, paler on sides of body and head. Underparts silvery white washed with greenish buff; upper surface of feet and tail cinnamon-brown, tail paler below.

Skull relatively long and narrow; first and second unicuspid teeth about equal in vertical length; third and fourth smaller, the fourth only a fraction smaller than the third; fifth unicuspid small and crowded, but tipped with pigment.

Measurements of two specimens from Nelta River: total length, 110, 120 mm.; tail vertebrae, 35, 40 mm.; hind foot, 15, 15 mm. Skull: greatest length, 21, 21.5 mm.; greatest breadth, 9, 9 mm. Distance from tip of first incisor to back of last premolar, 6, 5.5 mm.

These two specimens are here referred to this species. I have not seen any typical specimens of *S. a. borealis*, but they appear to be as close to this species as any other described form.

***Sorex macropygmaeus annexus* Thomas**

Korean Shrew

*Sorex annexus* THOMAS, 1906, Proc. Zool. Soc. London, p. 859.

Ten specimens: Monoma River, 4; Nelta River, 5; Bikin River, 1.

The Korean shrew is a small brown shrew similar externally to *S. m. macropygmaeus* but differs from the latter in having a flatter skull, broader rostrum, and broader interorbital.

Color of specimens from Amur and Ussuri River region in winter pelage, upperparts nearest to Prout's brown without distinctly darkened dorsal area; underparts washed with brownish white; upper side of tail like back; under side of tail, upper surface of feet, brownish white.

Skull larger than *S. minutus* but smaller than *S. araneus*; first four upper unicuspid teeth evenly graduated in size backwards.

Measurements, average of five largest specimens from Monoma and Nelta Rivers: total length, 91 mm. (90–95); tail vertebrae, 35.8 mm. (35–37); hind foot, 12.8 mm. (12.5–13). Skull: condylobasal length, 17.7 mm. (17.5–18); greatest breadth, 8.4 mm. (8.1–8.7); length of upper toothrow, 7.5 mm. (7.4–7.7).

Although the type description of *S. annexus* does not enable me to define it satisfactorily, I am convinced that the above specimens are referable to this species.

***Sorex unguiculatus* Dobson**

Big-clawed Shrew

*Sorex unguiculatus* DOBSON, 1890, Ann. Mag. Nat. Hist., (6) V, pp. 155–156.

Nine specimens: Monoma River, 4; Nelta River, 2; Mukhen River, 2; Bikin River, 1.

The big-clawed shrew is a large dark-colored species with a relatively

short tail and is readily distinguished from other known species of *Sorex* found in eastern Siberia by the exceptionally large size of the front feet and claws. In general appearance this species resembles *S. araneus*. The tail is evenly covered with rather stiff short hairs, which do not form a pencil at extremity. The color in winter pelage is uniform mummy brown above, below whitish washed with pinkish buff; fore and hind feet covered with short, soiled whitish hairs; tail dusky above, paler below.

The skull is short with a broad brain case. The second upper incisor is the most vertically extended and the largest of the unicuspid teeth; the third unicuspid is about equal to or only a shade smaller than the second, but exceeds the fourth in vertical length; the fifth unicuspid stands in line of the toothrow and is tipped with pigment; it is about as much smaller than the fourth as the latter is than the third.

Measurements, average of five adult specimens from Monoma and Nelta Rivers: total length, 115 mm. (110–121); tail vertebrae, 43 mm. (40–50); hind foot, 15 mm. (14.5–16). Skull: greatest length, 20.3 mm. (20–21); greatest breadth, 10 mm. (10–10); distance from tip of first incisor to back of last premolar, 5.25 mm. (5.2–5.5).

This shrew was found in low forested country along the banks of slow-moving rivers. During the winter months it feeds to a large extent on frozen salmon that are frequently seen protruding through the ice. In a lumber camp that I visited for lunch I caught two of these shrews as they ambled over the rough hewn logs that formed the floor, in search of scraps of boiled fish dropped by the lumber men.

#### ***Sorex gravesi* Goodwin**

##### Graves Shrew

*Sorex gravesi* GOODWIN, 1933, Amer. Mus. Novit., No. 657.

Two specimens: Monoma River.

The Graves shrew is a dark-colored shrew, about the size and external proportions of *S. araneus borealis*, but underparts dark blackish-brown; tail rather short, finely haired and tufted at tip; fore and hind feet large but not nearly so large as in *A. unguiculatus*.

Color of back dark mummy-brown, this color extending well over crown of head, sides, and down limbs to ankles; sides barely perceptibly paler than back; underparts mummy brown, very little lighter than back; feet snuff brown; tail about color of back above, below buffy at base but gradually shading darker toward tip which is dark all around; lips and chin soiled whitish.

Skull short with broad flattened brain case, the unicuspid teeth inclined forward, tips rounded and, viewed laterally, evenly graduated in size backward. The first unicuspid is the largest, the third is as much smaller than the second as the second is than the first, and the fourth is equally as much smaller than the third; the fifth unicuspid is smallest, evenly placed in the toothrow, tipped with pigment and relatively large.

Measurements: total length, 100 mm.; length of tail, 35 mm.; hind foot, 15 mm. Skull condylobasal length, 19.2 mm.; cranial breadth, 9.5 mm.; interorbital breadth, 4.1 mm.; palatal length, 8.1 mm.; maxillary breadth, 5.4 mm.; maxillary toothrow, 8.6 mm.; distance from tip of first upper incisor to back of last premolar, 5.6 mm.

*Sorex gravesi* may be distinguished from *unguiculatus* by its much smaller feet, finely haired and tufted tail, and dark-colored underparts. The dentition, however, is much the same, but the skull is proportionately smaller. The specimens were taken in low evergreen-forested country on the banks of the Monoma River, which eventually flows into the lower Amur.

***Sorex minutus gracillimus* Thomas**

Saghalien Pygmy Shrew

*Sorex minutus gracillimus* THOMAS, 1907, Proc. Zool. Soc. London, I, pp. 408-409.

Three specimens: Monoma River.

The Saghalien pygmy shrew is a very small species with a relatively long tail, similar in proportions to the smaller forms of European *S. minutus*.

Color of specimens in winter pelage from Monoma River: upperparts between mummy brown and sepia, the hairs slate gray at base and with silvery subterminal band giving rise to a grayish effect; underparts whitish washed with buff; sides not noticeably contrasted with back; tail hairy, sharply bicolor, above, color of back, below, wood brown; upper surface of feet wood brown.

Skull very light, delicate and narrowed in the facial region. In typical *S. minutus* the skull narrows evenly forward from the brain case, but in *S. m. gracillimus* the narrowing is much more abrupt in the interorbital region;  $p^4$  and molar teeth rather narrower than in true *S. minutus*.

Measurements, average of three skins from Monoma River: total length, 86 mm. (83-90); tail vertebrae, 38 mm. (37-40); hind foot, 11.6 mm. (11.3-12). Two skulls: condylobasal length, 15.35-15.4 mm.; basal length, 13.7-13.7 mm.; greatest breadth, 7.1-7.1 mm.; inter-



orbital breadth at posterior end of anteorbital foramina, 2.6–2.65 mm.; upper toothrow, 6.65–6.6 mm.

The *Monoma* specimens apparently average smaller with a narrower brain case than the type which, however, was based on a skull without skin and, apparently, an old animal. In view of the lack of material for comparison and the inadequate description, it seems best to refer these specimens to Thomas' subspecies.

***Ursus arctos mandchuricus* (Heude)**

Manchurian Brown Bear

*Ursarctos mandchuricus* HEUDE, 1898, Mém. Conc. l'Hist. Nat. l'Emp. Chin., IV, p. 23, Pl. 1.

One skull without skin: Nelta River, sixty miles north of Khabarovsk.

A large bear skull with well-worn teeth, purchased from the natives at a lumber camp, sixty miles north of Khabarovsk, is here provisionally referred to the above species. The brown bears of eastern Asia are rather imperfectly known. Gray's name (*lasiotus*) of 1867 appears to have been disregarded by later authors, but according to Lönnberg, it is applicable to the big bear of Mongolia and the interior of China. It is possible that this species is identical with *mandchuricus*, and, if such is the case, Gray's name has the priority. The question of identity of the two named forms can hardly be decided at the present time. Sowerby applied Heude's specific name *cavifrons* to a bear from North Kirin, Manchuria. In cranial measurements and characters described nothing prohibits the specific identity of this bear with the present specimen. Sowerby refers Heude's *cavifrons* to *Spelaeus*. As characteristic of the latter he mentions "very high forehead so that the cranial outline at this point is concave." The same is true of the present specimen. This character is very variable in other species of bears and there is a probability that the same is true here and the high brow may be an age character. The skull of *mandchuricus* is said to be large, long and narrow with a very slightly concave outline. The important skull characters mentioned by Gray as distinguishing the grizzly bears from the *arctos* group—a narrow palate constricted behind—are not mentioned for *cavifrons*, but if such should happen to be the case our Amur skull has nothing to do with it, because the latter has a broad palate not constricted behind the molars, and therefore belongs to the *arctos* group. Ognev accepts Heude's name, *mandchuricus*, and refers the big brown bear of northern Manchuria, Maritime and Amur districts, to this species.

Measurements: greatest length, 420 mm.; zygomatic breadth, 265 mm.; interorbital breadth, 118 mm.; width of palate inside  $p^2$ , least width of palate behind molars, 47 mm.; distance from back of palate to front of incisors, 217 mm.; front of canine to back of last molar, 157 mm.; combined length of  $p^4 m^1 m^2$ , 85 mm.; length of  $m^2$ , 42 mm.; width of  $m^2$ , 24 mm.; length of lower jaw, 275 mm.

The specimen was killed on February 7, by natives, who found its tracks in the snow in zero weather. I saw a number of bear skulls hung up on branches at the outskirts of Tungus villages to drive away evil spirits. They were all small skulls, however, and probably of the *Selenarctos thibetans* group.

***Nyctereutes procyonides amurensis* Matschie**

Amur Raccoon Dog

*Nyctereutes amurensis* MATSCHIE, 1908, 'Wissens. Erg. der Exped. Filchner nach China und Tibet,' 10 Band, 1 Theil, p. 179.

One native skin without skull from fur-trading station at Troitskov.

The long loose fur, small ears, and short bushy tail give this species a superficial resemblance to a raccoon. Color of an adult male in winter pelage from Troitskov: underfur on back golden cinnamon-brown, long guard-hairs warm buff liberally tipped with black; crown of head mixed cinnamon-buff and black, darker between the eyes; end of nose soiled whitish; ears golden cinnamon-brown sparsely washed with black; sides of body paler than back, a broad black streak across the eyes to throat; a tuft of long buffy hairs on side of head below the ears; chin, throat, fore and hind feet blackish brown, rest of underparts brownish drab; tail about color of back above, below clear warm buff.

***Mustela sibiricus coreanus* (Domaneski)**

Corean Yellow Mink

*Kolonocus sibiricus coreanus* DOMANESKI, 1926, Ann. Zool. Mus. Polinici Hist. Nat., V, No. 1, p. 55.

Eight complete specimens and four skulls without skins: Monoma River.

The Corean yellow mink is a moderately large weasel-like animal with a comparatively long tail. Average color of specimens in winter pelage from the Monoma River; upperparts, including limbs and tail, ochraceous buff, some specimens a shade darker and richer in color, approaching ochraceous orange; underparts barely perceptibly paler than back; lips, chin, and end of muzzle white; face mummy brown,

this color very intense and extending backward from base of whiskers to well behind the eyes. Domaneski's description of *M. s. coreanus*, based on two mounted specimens, states that it resembles *M. sibiricus* Pallas in color of the body, but differs in the more intense brownish color on the face, which reaches farther posteriorly, encompassing the eye. I have not seen typical specimens of either *M. sibiricus* or *M. s. coreanus*, but the Monoma series agrees sufficiently well with Domaneski's brief description to be referred to this species until more adequate material is available.

Measurements of two largest males from Monoma River: total length, 535, 540 mm.; tail vertebrae, 205, 195 mm.; hind foot, 67, 69 mm. Skull: condylobasal length, 63, 63.6 mm.; zygomatic breadth, 34.6, 32.2 mm.; length of upper tooththrow from front of canine to back of last molar, 18.5, 18.5 mm. Two females: total length, 460, 400 mm.; length of tail vertebrae, 160, 140 mm.; hind foot, 55, 55 mm. Skull: condylobasal length, 55, 54 mm.; zygomatic breadth, 26. 25.5 mm.; length of upper tooththrow, 16.5, 16 mm.

### ***Vulpes vulpes beringiana* (Middendorf)**

Toondra Fox

*Canis vulpes* var. *beringiana* MIDDENDORF, 1875, 'Übersicht der Natur Nord-und-Ost-Siberiens,' IV, part 2, p. 990.

One native skin without skull from fur-trading station at Troitskov.

There are two principal color types of this wide-ranging fox, an intense red-orange phase and a pale-colored form. A native skin from Troitskov is here provisionally referred to this species. In color it is pale orange mixed with buff on upperparts, more reddish brown on the mid-dorsal area, and clearer and brighter on neck and shoulders; ears black; tail above about color of back, the tips of the long hairs black; end of tail white; sides of body clear warm buff; upper lips with a broad white edge; throat, chest, and central part of belly white; outside of limbs orange with a streak of blackish brown down front of metacarpals and metatarsals; inside of limbs irregularly creamy white.

### ***Panthera tigris amurensis* (Dode)**

Manchurian Tiger

*Felis tigris* var. *amurensis* DODE, 1871, Proc. Zool. Soc. London, p. 480.

Three specimens: two adult males and one small adult female from fifty miles east of Bikin. (Two males mounted for exhibition.)

In winter pelage the Amur tiger appears to be considerably more robust than the perennially short, smooth-coated Indian tiger, which, to some extent, may be attributed to its long fur. However, the northern tiger averages heavier and is more powerfully built than species from southern Asia, but not to the same extent as appearances at first glance would indicate. In summer pelage some specimens of the Amur tiger are very little paler than its southern relatives, and the stripes are equally distinct, but it often has considerably more white on the sides of the face, sides and under parts of body than the latter. The Amur tiger, as shown by material brought back by the Morden-Graves Expedition, is subject to a rather wide variation in the ground color of the pelage; one of the two adult males in winter pelage from fifty miles east of the Bikin Ussuri region is a rich dark yellow, while the other from exactly the same region is much paler and quite light-colored.

Dode, when describing *amurensis* as distinguishable from the Indian tiger by having longer fur, paler color, and less pronounced stripes, states that it occurs on the banks of the Amur and of its tributary, the Ussuri. He appears to have been in the northeast corner of Manchuria, and according to Pocock the western or left bank of the Ussuri in Manchuria may be taken as the type locality of *amurensis*, therefore specimens taken fifty miles east of Bikin should be fairly typical.

Measurements of two males and one female respectively: total length, 10 feet, 9 feet 7 inches, 9 feet 3 inches; tail vertebrae, 3 feet 7 inches, 3 feet 8 inches, 3 feet 7 inches; hind foot from calcaneum to foot pads, 12 inches, 12 inches, 6½ inches; height at shoulder, 3 feet, 2 feet 8 inches, 2 feet 6 inches; weight, 506 lbs. (230 kilograms), 440 lbs. (200 kilograms), 368 lbs. (167 kilograms). Skulls of two adult males: greatest length, 345 mm., 335 mm.; zygomatic breadth, 237 mm., 237 mm.; condylobasal length, 308 mm., 315 mm.; interorbital constriction, 67 mm., 66 mm.; length of palate, 160 mm., 145 mm.; length of nasals, 110 mm., 99 mm.; length of upper toothrow from front of canine to back of last molar, 104 mm., 103 mm.

The three specimens brought back by the expedition were killed with trap guns. These are smooth-bore single-barrelled shotguns loaded with slugs, set up on stakes a few feet from where animals are known to pass. A piece of string or fine wire is stretched across the trail about a foot above the snow, from a tree on the opposite side to a piece of wood pivoted to the stock of the gun and attached to the trigger. A large animal, following the trail, strikes the string and the gun is discharged. Tiger trails were common fifty miles east of Bikin but less frequent at



localities visited farther north. On the Monoma River, east of Troitskov, we saw only one single trail where a tiger had passed through that country. Tracks at Bikin consisted of some well-worn trails, usually situated along the foot of high ridges and extending for many miles. These consisted of a series of holes in the snow where the snow was packed down about the size of a man's foot. In suitable hunting sections the tiger apparently leaves the main trail in search of its prey. The staple food of the tiger in winter is wild boar, and all the droppings I found consisted of 100 per cent boar hair. They also kill a number of other animals. We found the frozen carcass of an adult wapiti apparently pulled down by a tiger, but very little of it was eaten, and one specimen which the expedition obtained had a piece of horsehide in its stomach.

***Panthera pardus orientalis* (Schlegel)**

Amurland Panther

*Felis orientalis* SCHLEGEL, 1857, 'Handleitung der Dierkunde,' I, p. 23, Pl. II, fig. 13.

Two skins without skulls: Okiansk, Ussuri District, 1; Nikolsk Ussuriiskii, 1.

The Amurland panther is a pale-colored species with full soft fur and long bushy tail, differing from the ordinary Asiatic form in having much longer fur and larger spots. The skins of two specimens killed near Vladivostok agree closely with the type description of *Felis villosa* from Amur Bay, which is considered by Pocock as a synonym of *P. p. orientalis*. The ground color of these two specimens is creamy buff; the rosettes are large, few in number, well spaced, without noticeably darkened centers, and showing up very strongly against the pale hue of the interspaces; large spots on flanks measure about 2" × 2" and interspaces up to about 2"; throat, belly and inside of limbs white, evenly studded with large black spots; head slightly paler than back, with smaller spots. The female is a shade lighter in color than the male with closer pelage and smaller spots and rosettes.

The two specimens are without skulls. One is a large male shot by a policeman while it was killing a dog on a skating pond near Okiansk, Ussuri District, in February, 1930. The leopard seized and killed the dog in the midst of many children. The other is a female killed by a trap gun set for tigers near Nikolsk Ussuriiskii, January, 1930. The two, it is stated, were the only ones seen in the Fur Exporting Department at Vladivostok.

Measurements of tanned skins (cased): male, total length, 2040 mm.; length of tail, 730 mm. Female, total length, 1950 mm.; length of tail, 830 mm.

***Sciurus vulgaris mantchuricus* Thomas**

Manchurian Pine Squirrel

*Sciurus vulgaris mantchuricus* THOMAS, 1909, Ann. Mag. Nat. Hist., (8) IV, p. 501.

Six specimens: Monoma River, 1; Nelta River, 1; Troitskov, 1 native skin; Barracks, twenty miles east of Troitskov, 2 skins and 3 skulls.

The Manchurian pine squirrel is the largest of the eastern Siberian squirrels. In winter pelage it has long well-developed ear tufts and a large bushy tail. Color of the type specimen in winter pelage; blackish gray with scarcely a trace of rufous; ear tufts black; tail black with inferior surface nearly as uniformly dark as the superior, without rufous tinge. Throat, belly, and arms creamy white. Skull conspicuously larger than any other of the eastern races of *S. vulgaris*.

Four specimens from the Amur River region about two hundred miles north of Khabarovsk agree with the type description in size and general characters, but are apparently somewhat paler and more grizzled in color. One specimen, a native skin without skull, is soiled yellowish white with brownish ear tufts and tail.

Measurements of two specimens, one from Monoma River, and one from the Barracks, 20 miles east of Troitskov, with type measurements in parenthesis: total length, 430, 390 mm. (455); tail vertebrae, 195, 190 mm. (205); hind foot, 65, 65 mm. (61). Skull: condylobasal length, 50.4, 50.2 mm. (52.3); zygomatic breadth, 33, 31.9 mm. (33.5); upper molar series, 10, 10 mm. (9.6).

Squirrels from the Amur region are much sought after by the fur trade owing to their large size and good color. Every native man and boy and many hunters from the neighboring cities spend the early part of the winter hunting squirrels. At the fur-trading station at Troitskov I saw several large bales of squirrel skins containing many thousands of specimens.

In the forest, squirrels are extremely shy and, toward Christmas, are very scarce. They apparently feed principally on the seeds of pine and fir cones and tracks were frequently seen in the snow.

***Pteromys russicus aluco* (Thomas)**

## Maritime Province Flying Squirrel

*Sciuropterus aluco* THOMAS, 1907, Proc. Zool. Soc. London, II, pp. 464-465.

One complete specimen and one skull without skin: Nelta River, 1 skull (immature); fifty miles east of Bikin, 1 skull and skin.

The Maritime Province flying squirrel is a small nocturnal squirrel with soft downy fur, large eyes, flat buffy tail, and loose-furred skin extending from fore feet along sides of body. In size and color it is intermediate between typical *P. russicus* and *P. momonga*.

Color of upperparts buffy drab, not so strong as in *momonga*, nor of such clear gray as in *russicus*. Upperparts of hands and feet gray, the light hairs on the toes cream-color; tail pinkish buff, the intermixed black hairs of the upper layer usually few in number and therefore not hiding the buff. Skull narrow, sides of muzzle parallel and less expanded anteriorly than in *P. russicus*. Palatal foramina rather long. Bullae larger than in *momonga*, decidedly smaller than in *russicus*. Cheek teeth very small.

Measurements of adult female from thirty miles east of Bikin, with type measurements in parenthesis: total length, 245 mm. (306); tail vertebrae, 110 mm. (149); hind foot, 34 mm. (35). Skull: greatest length, 36.8 mm. (39); condylobasal length, 33.8 mm. (—); zygomatic breadth, 23 mm. (23); length of upper molar series, except pm<sup>3</sup>, 6 mm. (6.5).

Flying squirrels, though apparently fairly common in the regions visited, were difficult to trap. It is probable that during the coldest period of the winter, when most of my collecting was done, they do not move around much.

The specimen collected east of Bikin agrees closely in color and in general characters with Thomas's description of *P. aluco*, and it seems referable to that form, though the measurements of this specimen average a shade smaller.

The name *russicus* is used here for the Russian flying squirrel in preference to *volans*, which is restricted to American forms. The primary basis for *Mus volans* of Linnaeus was Ray's *Sciurus americanus volans* ('Quadr.', p. 215, 1693) which was undoubtedly founded on the American species. (See Howell, A. H., 1918, 'North American Fauna,' No. 44, p. 19.)

***Clethrionomys rutilus amurensis* (Schrenck)**

Amur Red-backed Mouse

*Mus amurensis* SCHRENCK, 1859, 'Reise Amur-lande,' I, p. 129.

Fourteen specimens: Monoma River, 5; Nelta River, 9.

The Amur red-backed mouse is a small pale-colored form with long soft pelage and short hairy tail. Color of specimens from Monoma River in winter pelage: dorsal area reddish orange-cinnamon; flanks, cheeks and front of head warm buff; the pale lateral area extends well up over sides to shoulders and face. Tail sharply bicolor, above, color of back, under side warm buff; underparts buffy white; fore and hind feet white.

Skull small with slender arches and more or less rounded loops on molars, but otherwise similar in general characters to other species of *C. rutilus*, with three well-developed, and in some instances four, folds in third upper molar. The reëntrant fold on the anterior side of the first lower molar in the type specimen of *C. amurensis* is probably due to individual variation, as one specimen from the Monoma River has similar folds in the first upper molars with well-formed grooves down the front of the teeth; some other individuals have a faint suggestion of similar folds.

Measurements, average of 5 adult specimens from Monoma River, with the type measurements in brackets: total length, 121 mm. (105–150) [138]; tail vertebrae, 24 mm. (20–27) [37]; hind foot, 19 mm. (18–20) [18]. Skull: condylobasal length, 22.6 mm. (22–23); zygomatic breadth, 12.8 mm. (12–13); length of upper molar series, 4.9 mm. (4.5–5).

The Monoma River is about two hundred miles south of Nickolivsk, the type locality for *C. amurensis*, and specimens collected here and on the Nelta River, a little farther south, agree sufficiently well with the type description to be referable to this species, which, in the writer's opinion, should be considered as a subspecies of *rutilus*. Specimens were taken in low tamarack swamp along with the larger and darker-colored *Clethrionomys arsenjevi*.

***Clethrionomys rufocanus arsenjevi* (Dukelski)**

Arsenieff Red-backed Mouse

*Evotomys (Craseomys) arsenjevi* DUKELSKI, 1928 (May 15), Zool. Anzeiger, Band 77, Heft ½, p. 40.

Thirty-three specimens: Monoma River, 17; Nelta River, 16.

A series of red-backed mice from the Monoma and Nelta Rivers are referred here provisionally to the above species. In color they apparently agree fairly closely with the type description: winter pelage, upper-



parts uniform rusty brown between tawny and cinnamon, face and sides of body grizzled (mixed pale buffy and black hairs); underparts washed with pale buffy; feet soiled whitish, tail dusky above, buffy below. In cranial measurements they average slightly larger than the type, but agree with the latter in having angular and heavily constructed zygomatic arches, short rostrum, broad brain case, molar toothrow lengthened, last upper molar with two well-developed folds on inner side.

I have not been able to find a description or type locality for *E. ussuriensis* Ognev.<sup>1</sup> Later authors appear to have disregarded this name more or less, but if Ognev's type was a specimen from the Ussuri region and of the *rufocanus* group, this name probably would be applicable to the present series.

Measurements, average of five adult specimens from Monoma River, with type measurements in brackets: total length, 135 mm. (130–136) [144.7]; tail vertebrae, 30 mm. (25–32) [30.2]; hind foot, 20.5 mm. (20–21) [18.3 without claws]; condylobasal length, 25.4 mm. (25.–25.8) [24.3]; zygomatic breadth, 14.7 mm. (14.2–15) [14.2]; upper molar series, 6.2 mm. (6–6.6) [6.2].

The type of *C. arsenjevi* was described as from seventy-five versts northeast of Vladivostok, collected June 22, 1927, and apparently in summer pelage, while our specimens were taken in mid-winter; therefore a discrepancy in color could be expected. The skull of the latter, however, averages larger and possibly more massive than the type, but general characters are approximately the same. In the present series the presence of a fourth outer reëntrant angle on  $m^3$  is most noticeable when viewed from the side and only indicated on the crown of the tooth by a slightly concave outline at this point. The additional angle can be seen definitely only in a few individuals of the present large series. The posterior lobe of  $m^3$  correlating with the extra fold is relatively short and rounded but more or less drawn out when the extra fold is not present. Both skins and skulls of our specimens approach *C. rufocanus* and the author considers this form as a Ussurian subspecies of that group.

### **Mus (Alsomys) major rufulus Dukelski**

Ussuri Wood Mouse

*Mus (Alsomys) major rufulus* DUKELSKI, 1928 (May 15), Zool. Anzeiger, Band 77, Heft ½, p. 44.

Three specimens: Monoma River, 1; Nanke, 1; Nelta River, 1.

<sup>1</sup>S. I. Ognev writes under date of November 28, 1933, in a letter to the author: “. . . *The Evotomys ussuriensis* is a *nomen nudum*. I had the project to describe *Evotomys ussuriensis*, but this project was not realized for want of material.”

The Ussuri wood mouse is a relatively large tawny mouse with a long tail and large ears. It is larger and more reddish than the typical form. Color of type in summer pelage: upperparts uniform, between buckthorn brown and sayal brown and without dorsal stripe; fore and hind feet white; underparts white; tail bicolor, blackish brown above, soiled white below. Specimens from the Amur River region in winter pelage apparently are paler than the type specimen, with underparts creamy white.

Skull relatively heavy, rostrum elongated, zygomatic arches wide.

Measurements, average of three adult male specimens from Monoma River, Nelta River, and Nanke, with type measurements in brackets: total length, 190.7 mm. (180–197) [233.6]; tail vertebrae, 91.7 mm. (85–95) [111.5]; hind foot, 26 mm. (25–27) [24.9, without claws]. Skull: condylobasal length, 25.9 mm. (25.9–26) [24.2]; zygomatic breadth, 14 mm. (14–14.2) [14.8]; upper molar series, 4 mm. (3.8–4.2) [4.2].

The three specimens collected are referred here provisionally to *M. major rufulus*. They are from three different localities but from a similar environment and, while they show considerable individual variation and average slightly smaller than the type, they apparently agree in all essential characters with this subspecies.

This mouse was difficult to trap in the regions visited during the months of January and February, which, however, may have been due to the excessive cold.

### ***Rattus norvegicus caraco* (Pallas)**

Transbaikalia Brown Rat

*Mus caraco* PALLAS, 1778, 'Nov. Sp. Glir.,' pp. 91, 335, Pl. XXIII.

One specimen: Don Don River.

The native brown rat of Transbaikalia is similar in general characters to the typical Norway rat, but smaller. The hind foot of the Transbaikalian rat measures about 35 mm. as compared with 40 mm. or more in the typical form. The skull is also smaller than the latter. Summer pelage about as in *R. n. norvegicus*. Color of an adult male in winter coat from the Don Don River, fifty miles east of Troitskov, is much paler; upperparts ochraceous buff washed with brown-tipped guard hairs, paler on sides of body; underparts warm buff; fore and hind feet white; tail dusky above, whitish below. The fur in this specimen is long, soft and full.

Measurements: total length, 300 mm.; tail vertebrae, 150 mm.; hind foot, 38 mm. Skull: greatest length, 44 mm.; zygomatic breadth, 22.9 mm.; interorbital constriction, 6 mm.; length of upper molar series, 7.2 mm.; width of brain case back of zygomatic arches, 16 mm.

The range of the Transbaikalian brown rat is imperfectly known, and available material for comparison is limited. The present specimen is an old male with well-worn teeth. It averages slightly larger than the measurements for typical *R. n. caraco*, but the skull is decidedly smaller, with a narrower brain case than that of *R. n. norvegicus* at the same age.

The single specimen was taken on the banks of the Don Don River, ten miles from the nearest native village and fifty miles from Troitskov and the Amur, and apparently living under natural conditions.

#### ***Lepus timidus mordeni*, new subspecies**

TYPE.—No. 85408, Amer. Mus. Nat. Hist.; ♂ ad.; Monoma River, eighty miles east of Troitskov, Maritime Province, eastern Siberia; January 16, 1930; collector, George G. Goodwin. The type is a skin and skull in good condition.

GENERAL CHARACTERS.—A large hare, similar to *Lepus timidus gichiganus* Allen and *Lepus t. orii* Kuroda, but distinguishable from both by its shorter skull and larger dentition.

DESCRIPTION.—Winter pelage pure white to extreme base of under fur. Ears tipped with black.

Skull relatively small with narrow rostrum and nasals; rather flattened brain case; postorbital constriction narrow; bulla small but well rounded; supraorbital process long and gradually tapering posteriorly to a narrow neck; molar and incisor teeth large and broad; though the skull is considerably smaller than in *gichiganus*, the teeth are actually larger, this character being most noticeable in the width of the lower incisors which are 3 mm. wide as compared with 2.5 mm. in *gichiganus*; the first upper premolar with two well-developed reentrant angles on its anterior surface, almost subequal, the interior angle only a fraction deeper than exterior angle; the crown is 5 mm. across instead of 4 mm. and 4.5 mm. as in *gichiganus*; other teeth are correspondingly greater in size than in the latter species; the largest upper molar is 6.5 mm. across the crown in the Monoma specimen as compared with an average of 5.7 (5–6) as in *gichiganus*. Compared with *L. t. orii* from Sakhalin the skull is smaller, especially in total length and zygomatic breadth.

MEASUREMENTS (taken in the flesh).—Total length, 570 mm.; tail vertebrae, 40 mm.; hind foot, 180 mm.; length of ear from notch, in dried skin, 37 mm. Skull: greatest length, 92 mm.; condylobasal length, 82 mm.; zygomatic breadth, 47 mm.; length of nasals, 37 mm.; width of nasals at base, 18.5 mm.; postorbital constriction, 14 mm.; length of supraorbital process, 18 mm.; alveolar length of upper molar series, 19.5 mm.; length of lower jaw exclusive of incisors, 69 mm.; depth of lower jaw, 45 mm.

It is surprising to find an apparently undescribed hare in the Maritime Province. However, the specimen from the Monoma River differs

sufficiently well in cranial characters from *L. t. gichiganus* and from *L. t. orii* from Sakhalin, its nearest allied species, to be recognized as a distinct form. Lack of comparative material from Lake Baikal makes it difficult to determine its exact relationship to *L. t. transbaikalicus* Ogneff. In the type description of the Transbaikalian form the skull is represented as smaller than *gichiganus* and the teeth are apparently correspondingly smaller, whereas in the Monoma specimen the skull is equally smaller than *gichiganus*, but the teeth are definitely larger; furthermore, the two localities are widely separated and conditions are so diversified that a marked difference would be expected.

*Lepus t. mordeni* in some respects appears to be intermediate between *L. t. gichiganus* and *L. mantschuricus* and approaches the latter in the size of the lower incisor teeth, development of reëntrant angles on anterior surface of upper premolars, roundness of the bullae, and shape of the supraorbital process. The skull, however, is heavier and resembles the *timidus* group in more general characters.

The one specimen secured was taken in the "taiga" on a well-beaten rabbit track at the side of a small stream. Further trapping here yielded no additional specimens and no other tracks were seen in the vicinity. Local hunters seemed to consider the white hare quite rare, and I saw no evidence of its fur being used for clothing by the natives.

### ***Sus scrofa ussuricus* Heude**

#### Ussuri Wild Boar

*Sus ussuricus* HEUDE, 1896, Mem. Conc. l'Hist. Nat. de l'Emp. Chin., III, p. 190.

Two specimens: Mukhen and Alche River District, 1 adult male; Amur River, near Troitskov, 1 female.

The Ussuri species is equal to, if not the largest, race of wild boar found in Europe and Asia. In external appearance it agrees more or less with the description of typical *Sus scrofa* of western Europe. Color of a semi-adult female in winter pelage from near Troitskov: upperparts mixed warm buff and black, the longest coarse hairs black, shorter coarse hairs black at base and liberally tipped with warm buff; on the shoulder the hair in the mid-line is longer, forming a stiff mane; chin blackish brown, an indistinct white line from behind angle of mouth to throat; underparts with black hairs tipped with pale buff or whitish and without all-black hairs. There is an abundant growth of brownish gray woolly under hair throughout the pelage. An adult male from the Mukhen River is much darker than the female; the buffy hairs on back are tipped



with black and all black hairs predominate; sides of body, limbs and snout blackish brown, underparts very little paler.

Measurements: skull, adult male, greatest length from occipital plane to anterior end of nasals, 420 mm.; length along top of skull in a straight line, 445 mm.

Wild boars were not uncommon in suitable localities visited in eastern Siberia and probably form the principal food of the tiger in that region. I did not see the large male secured by the expedition before it was skinned, but from all accounts it was an enormous brute.

***Moschus moschiferus parvipes* Hollister**

Korean Musk-deer

*Moschus parvipes* HOLLISTER, 1911, Proc. Biol. Soc. Wash., XXIV, pp. 1-2.

Three immature specimens: Monoma River.

The Korean musk-deer is a small, spotted, dark-colored, hornless deer with long brittle hair in winter pelage. The males have long slender canine teeth in upper jaw. According to Hollister, *M. m. parvipes* is smaller than typical *M. moschiferus*, the legs are relatively short and slender, feet small, with smaller main and lateral hoofs. Color of Monoma series in winter pelage: upperparts dark mummy-brown mixed with warm buff and indistinctly spotted with warm buff; the spots are arranged in more or less irregular transverse rows, most distinct on the posterior part of back and hips, linked together on the shoulders. Top of head from nose to nape mixed dark mummy-brown; cheeks and ears paler brown and white, a white streak from below eye to throat, another white streak from below ear joins white of throat at side of neck and extends backward to shoulders; sides of body dark mummy-brown; underparts mixed brown and white; limbs dark brown; inside of fore limbs and front of hind limbs with a streak of brown and white. Flerov, in his study of the genus *Moschus*, based on the extensive material in Russia, stated that the skull (145.4 mm.) of *M. m. parvipes* is smaller than that of typical *M. m. moschiferus*, occupying an intermediate place between the musk deer of Siberia and that of Sakhalin. The metacarpals (126.5 mm.) and the metatarsals (167.4 mm.) are shorter and finer than in *M. m. moschiferus*. The type locality for *M. m. parvipes* is the mountains near Mok-po, Korea. Flerov extends the range of this species north to the Ussuri district and as far as the mouth of the Amur. Three specimens from the Monoma River, one male and two females, are too young to show any very definite specific cranial characters and provisionally are referred to this species.

***Cervus xanthopygus* Milne-Edwards**

## Manchurian Wapiti

*Cervus xanthopygus* MILNE-EDWARDS, 1867, Ann. Soc. Nat., VIII, p. 376; 1871, 'Recherches Mamm.,' p. 181, Pl. XXI.

One skull without skin: Mukhen and Alche River District.

In general appearance the Manchurian wapiti differs from other known forms in the shortness and stoutness of the horns and uniformly lighter and grayer coloration. In winter pelage the body is grayish brown, washed with chestnut, more intense on neck and forehead. Muzzle brown, darkening toward tip; no white on chin. Legs gray-brown, slightly darker on the anterior surface; a distinct brown mid-dorsal line, most pronounced on neck; summer pelage red or chestnut.

Measurements, skull of an old male from Mukhen and Alche River District: greatest length, 435 mm.; greatest breadth, 185 mm.; antlers, tines 5+5, length of outside curve, 29 inches. Measurements of a pair of horns from thirty miles east of Bikin: tines 5+5, length of outside curve, 28¾ inches; greatest spread, 24½ inches.

Tracks of Manchurian wapiti were common in the forested regions visited east of Bikin. North of Khabarovsk they were not so abundant and none were seen in the region east of Troitskov, which may have been purely a coincidence.

Unfortunately, I was not able to save a specimen that had apparently been killed by a tiger east of Bikin. Only a small portion was eaten, but it was frozen hard and too far from camp to attempt to move it.